Program Support: Perspectives and Systemic Issues

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Top Five Systems Engineering Issues*

- Lack of awareness of the importance, value, timing, accountability, and organizational structure of SE on programs
- Adequate, qualified resources are generally not available within government and industry for allocation on major programs
- Insufficient SE tools and environments to effectively execute SE on programs
- Requirements definition, development, and management is not applied consistently and effectively
- Poor initial program formulation

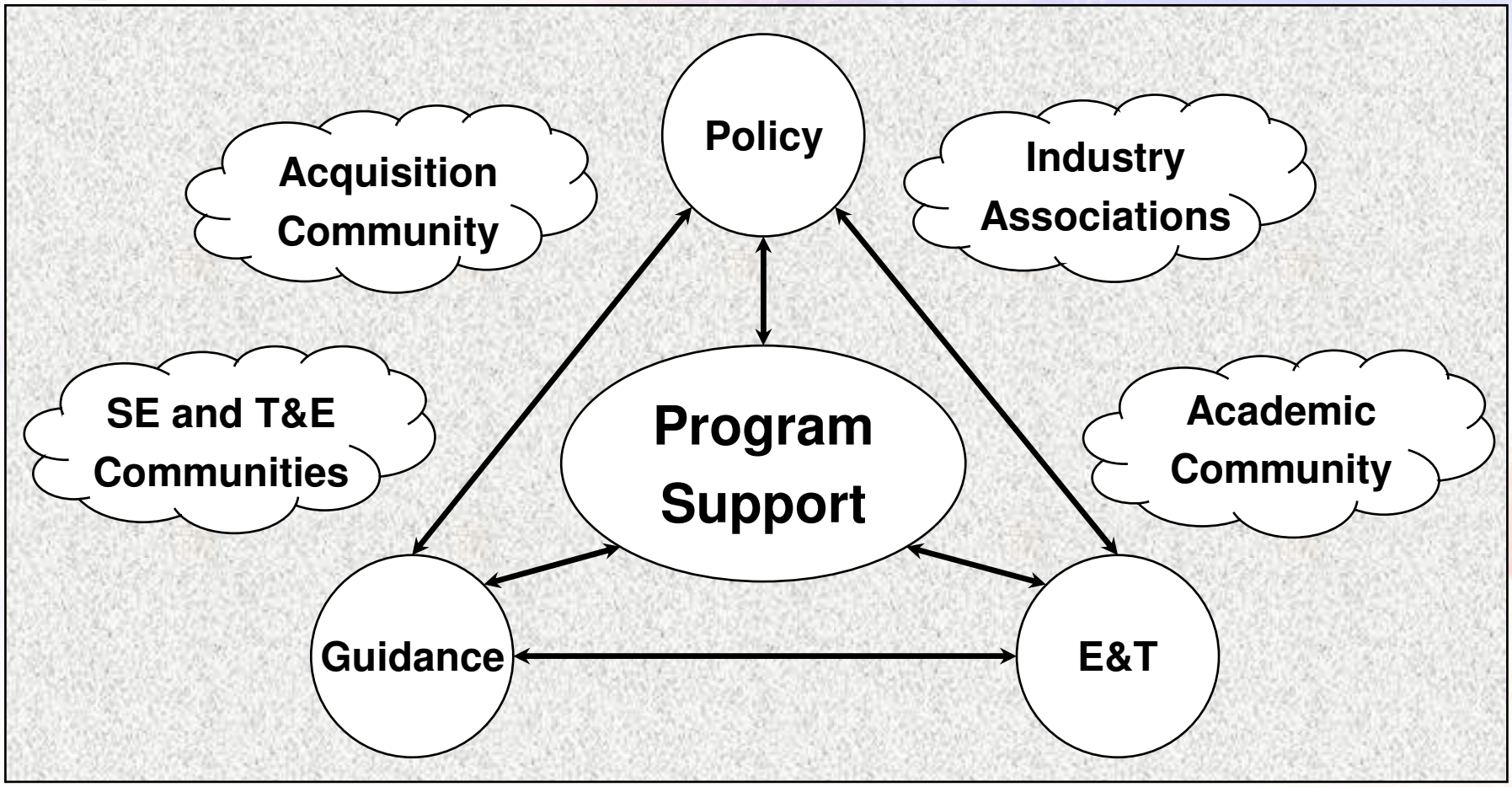
*** Based on an NDIA Study in January 2003**

Recap: What We Have Done To Revitalize Systems Engineering

- Issued Systems Engineering (SE) policy
- Issued guidance on SE and Test & Evaluation (T&E)
- Integrating Developmental T&E with SE policy and assessment functions – focused on effective, early engagement of both
- Instituted system-level assessments in support of OSD major acquisition program oversight role
- Established SE Forum – senior-level focus within DoD
- Working with Defense Acquisition University to revise SE, T&E, and enabling career fields curricula
- Leveraging close working relationships with industry and academia

Necessary but not sufficient!

Systems Engineering Revitalization Framework



Driving Technical Excellence into Programs!

Driving Technical Rigor Back into Programs "Portfolio Challenge"

- Defense Systems was tasked to:
  - Review program's SE Plan (SEP) and T&E Master Plan (TEMP)
  - Conduct program support reviews
- Portfolio of major acquisition (ACAT ID and IAM) programs, supporting both Defense Systems and NII led OIPTs:
  - Business Systems
  - Communication Systems
  - C2ISR Systems
  - Fixed Wing Aircraft
  - Unmanned Systems
  - Rotary Wing Aircraft
  - Land Systems
  - Ships
  - Munitions
  - Missiles

Systems Engineering and T&E Support to Over 150 Major Programs in Ten Domain Areas

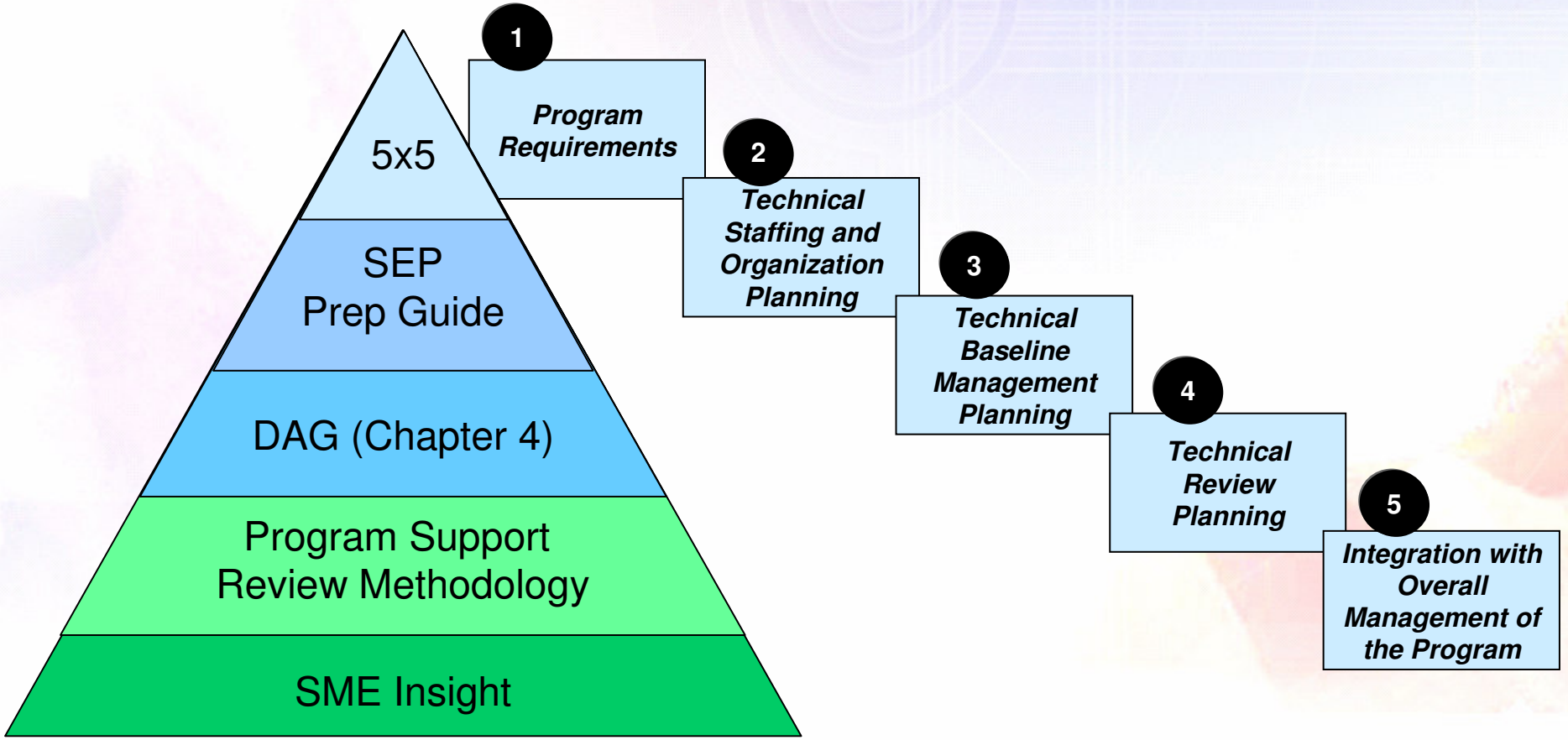
Driving Technical Excellence into Programs

Topic	Systems Engineering	Test & Evaluation	Risk Management	Exit Criteria	Acquisition Strategy
Focus Areas	Requirements	V&V Traceability	Risk ID	Mission Systems	Mission Capability
	Organization & Staffing	Test Resources	Risk Analysis	Support	Resources & Management
	Technical Reviews	Test Articles	Risk Mitigation Planning	Manufacturing	Technical Process
	Technical Baseline	Evaluation	Risk Tracking	R & M	Technical Product
	Linkage w/ Other Program Mgmt & Controls	Linkage w/ Other Program Mgmt & Controls	Evidence of Effectiveness	Net Centric	Enterprise Environment
Product	SEP	TEMP	RM Plan	Phase Exit Criteria	ASR/APB

Examples

SEP Evaluation Areas

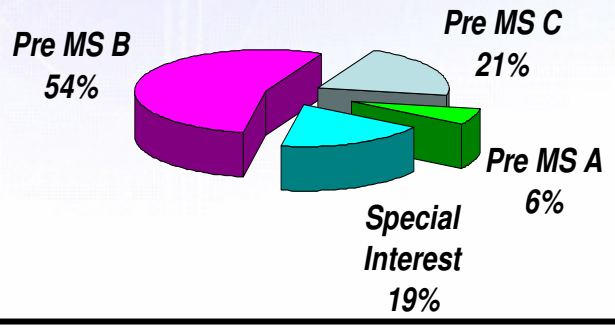
- Structured approach with multiple perspectives



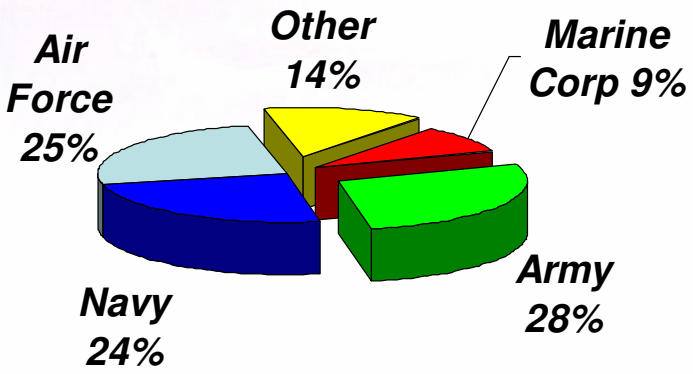
Systems Engineering Plan Activity
(since November 2004)

- Programs submitting SEPs: 47
- Number of SEPs reviewed: 79
  - Approved: 12
  - Pending final approval: 1
  - Pending draft review: 10
- Reviews planned for rest of FY06: >100

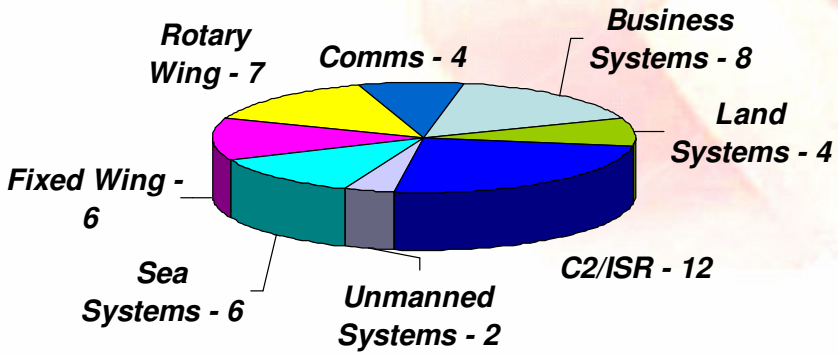
SEP Program Milestones



Component-Managed Acquisitions

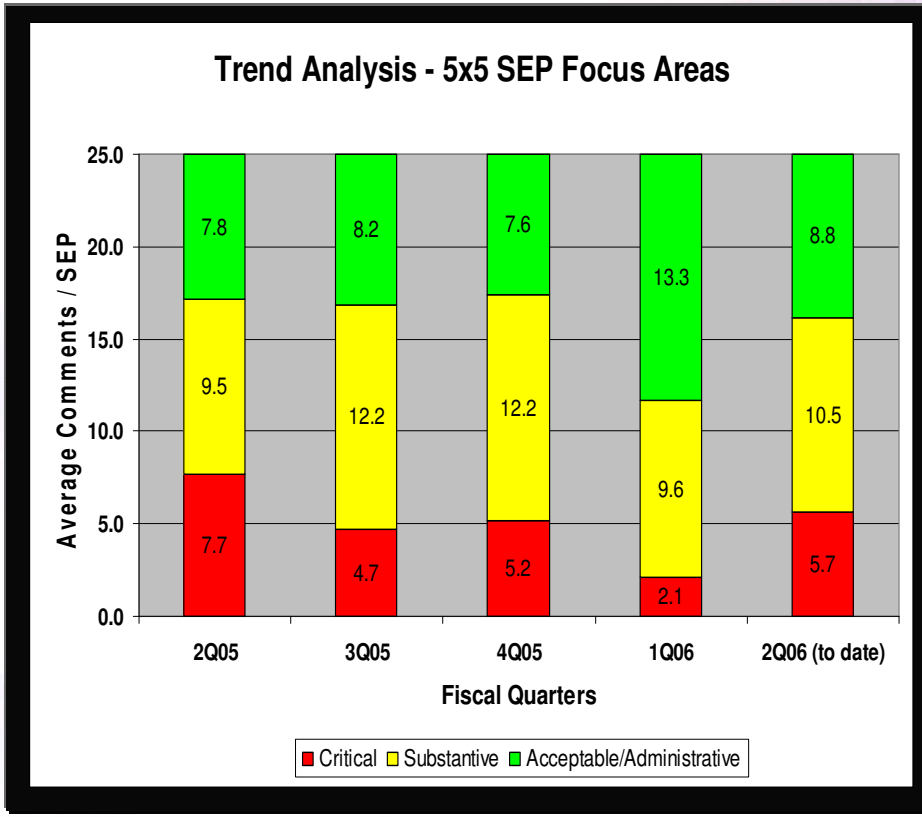


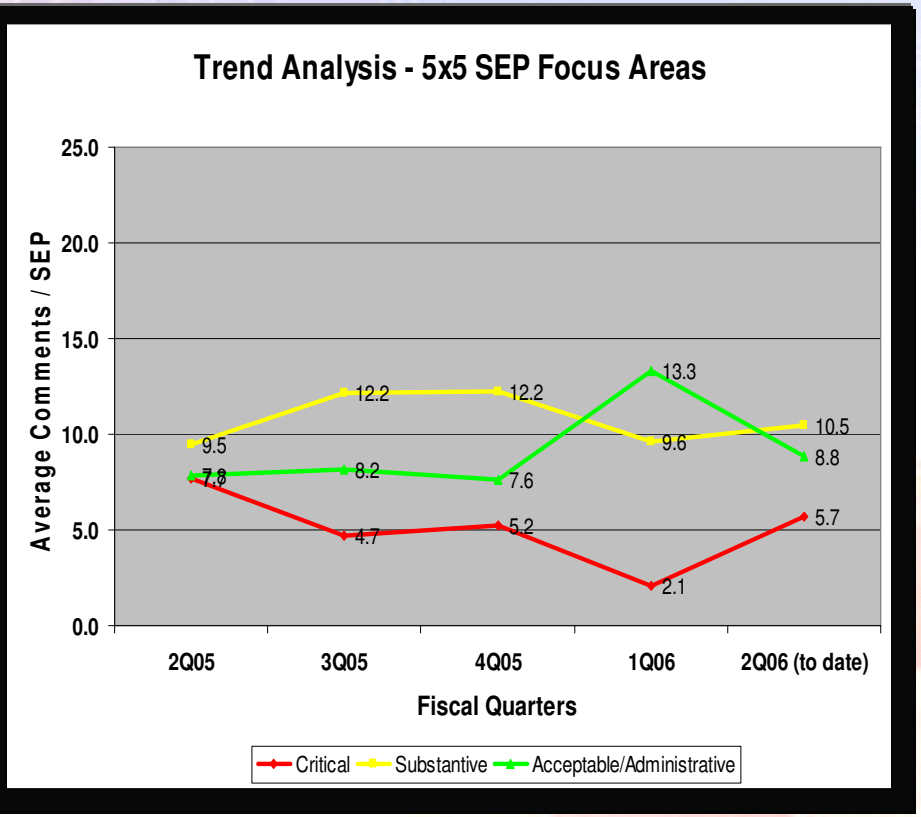
Programs by Product Line



Emerging SEP Issues - Trends**
(not systemic across all programs)

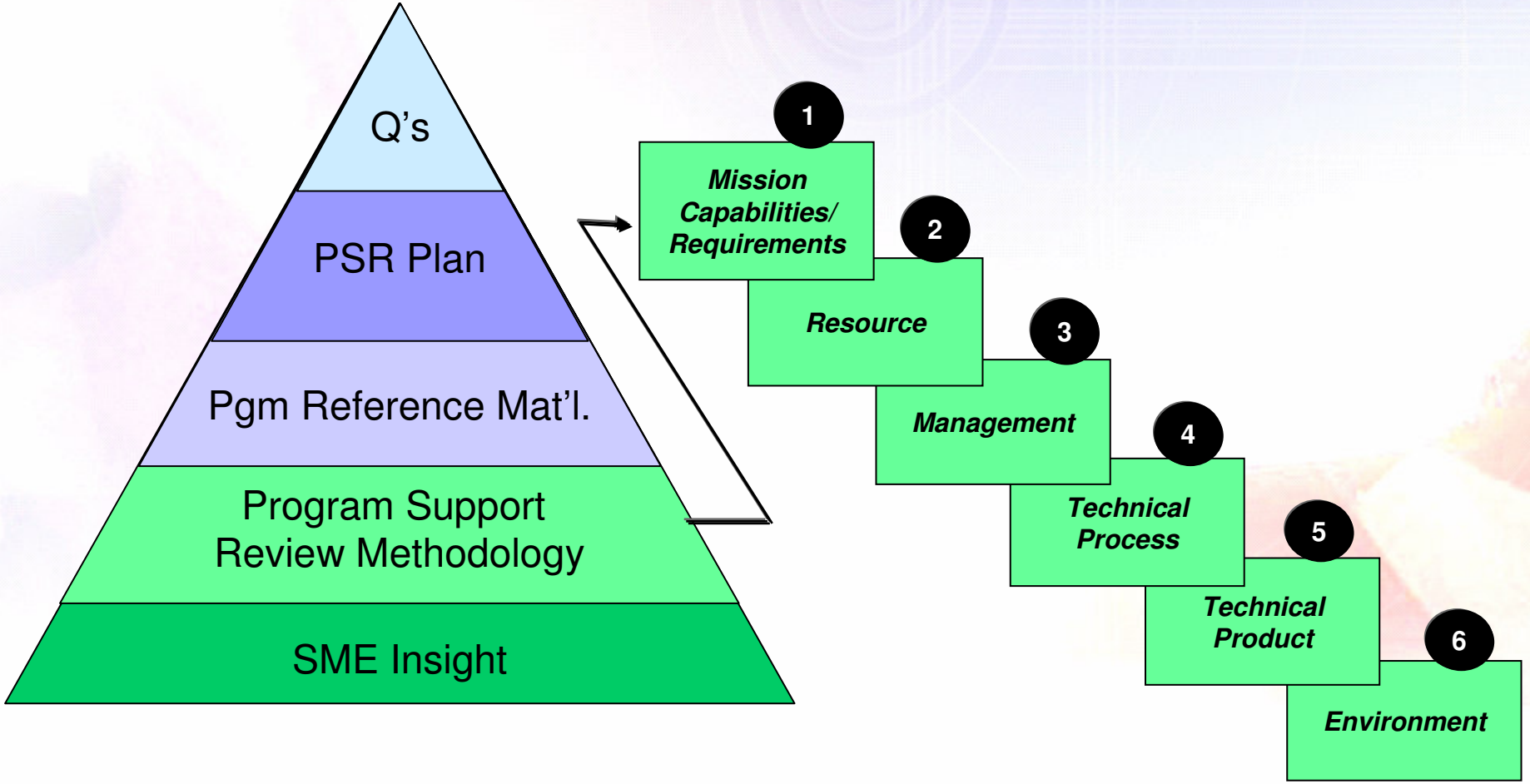
**BASED ON ANALYSIS OF 47 PROGRAMS





PSR Evaluation Areas

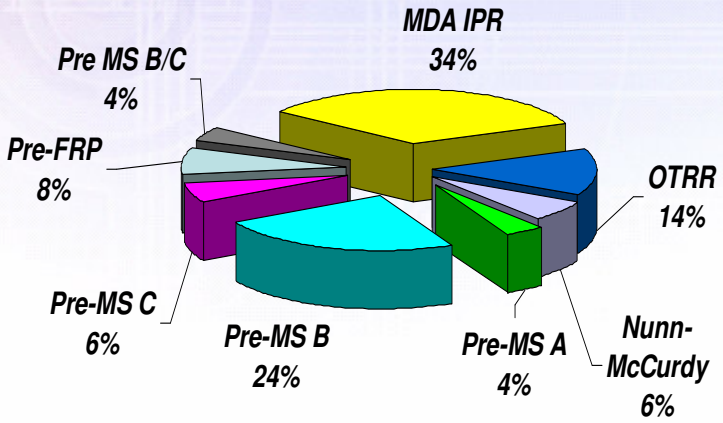
- Repeatable, tailorable, exportable



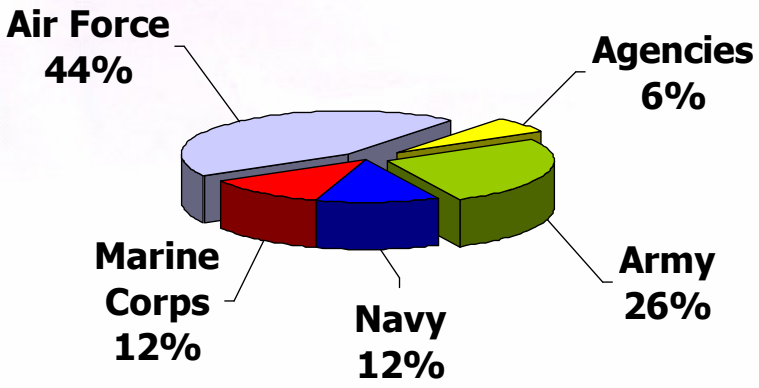
Program Support Review Activity
(since March 2004)

- PSRs/NARs completed: 33
- AOTRs completed: 7
- Nunn-McCurdy Certification: 3
- Participation on Service-led IRT's: 4
- Technical Reviews: 3
- Reviews planned for rest of FY06
  - PSRs/NARs: 12+
  - AOTRs: 2
  - Nunn-McCurdy: 2

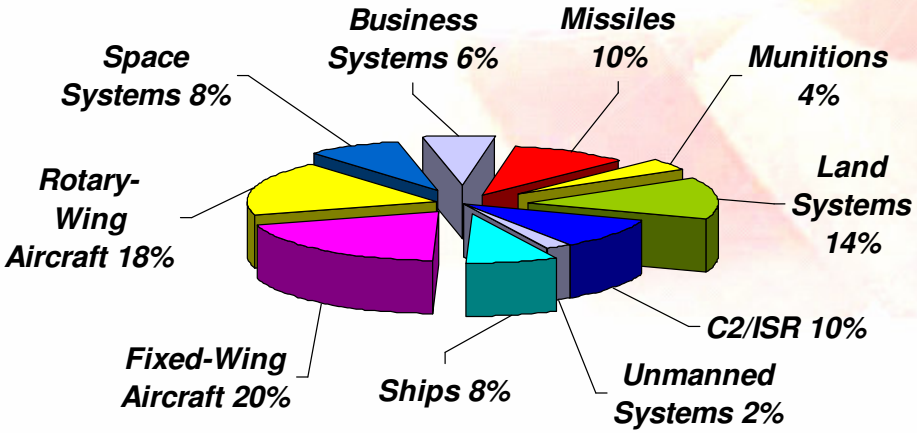
Decision Support Reviews



Service-Managed Acquisitions



Programs by Domain Area



Representative Systemic Issues (1 of 4)

1.0 Mission Capabilities/Requirements

- Reliability requirements lack mission context
- Lack of growth margins
- Upgrade programs lack measurable baseline requirements
- Systems of Systems not well defined; Stovepiped ORDs/CDDs
- Requirement creep leads to systems engineering churn
- Difficulty in balancing requirements (e.g., transportability, lethality and survivability requirements)

2.0 Resources

- Small, overworked program offices
- Plans to evaluate joint interoperability not well defined

Representative Systemic Issues (2 of 4)

3.0 Management

- Reluctance to demonstrate key functionality in SDD phase
  - » Integration of Mission Equipment Packages onto platforms
- Success oriented schedules trivialize integration risks
  - » COTS poses integration and support challenges
- Concurrent development and testing schedules
- Lack of planning for follow-on increments and technical refresh
- Avoidance of quantifiable Milestone exit criteria
- PMs not leveraging lessons learned from other programs
- Lack of overall SoS integrator with authority and resources
  - » Poor funding commitment for SoS programs
  - » Lack of issue resolution process across program and Service lines
- Poor communication across IPTs
- Lack of measures-driven approach to risk management

Representative Systemic Issues (3 of 4)

4.0 Technical Process

- Dependence on critical technologies
  - » Late Technology Readiness Assessments preclude ITAs
- Technology Development phase not used properly to mitigate risks
- Lack of disciplined SE processes and SE reviews, on all programs
  - » No “time” to conduct full suite of SE technical reviews
  - » Insufficient time between SE technical reviews
- Limited capability demonstrated by MS C
- Systems Engineering
  - » Lack of disciplined SE process, metrics, missing technical reviews, technology risks not mitigated
- T&E Planning
  - » Success oriented T&E schedules; No time for corrective actions
  - » Lack of attention to reliability growth
  - » Poor plans to mature suitability during SDD phase
  - » Hesitancy to establish exit criteria for test phases
  - » Plans to evaluate joint interoperability not well defined

Representative Systemic Issues (4 of 4)

5.0 Technical Product

- Production Planning
  - » Production Readiness Reviews (PRRs) not always conducted
    - PRRs at key suppliers not always planned
  - » Lack of supplier management plans
  - » Movement to improving processes; eliminating waste
- Software
  - » Software processes not institutionalized
  - » No plans to apply lessons learned into successive builds
  - » Systems and spiral software requirements undefined
  - » Software reuse strategies are inconsistent across programs
  - » Software support plan missing

Systemic Analysis Vision and Expected Outcomes

Vision: Illuminate systemic program performance strengths and weaknesses in an informative and consistent manner in support of stakeholder decision making and more effective acquisition policy, education and training.

Desired Outcomes:

Near Term

Improved state of the practice

- Provide foundational information to support policy, education, training and identification of best practices
- Inform target audiences of issues and their root causes, risks and recommended solutions based on lessons learned
- Improve PSR process (e.g. methodology, training for teams, templates etc.)

Mid Term

Informed decisions

- Data to inform leadership decisions, and support leadership questions
- Ability to correlate program symptoms (seen in OIPTs, DAES, etc) to systemic indicators

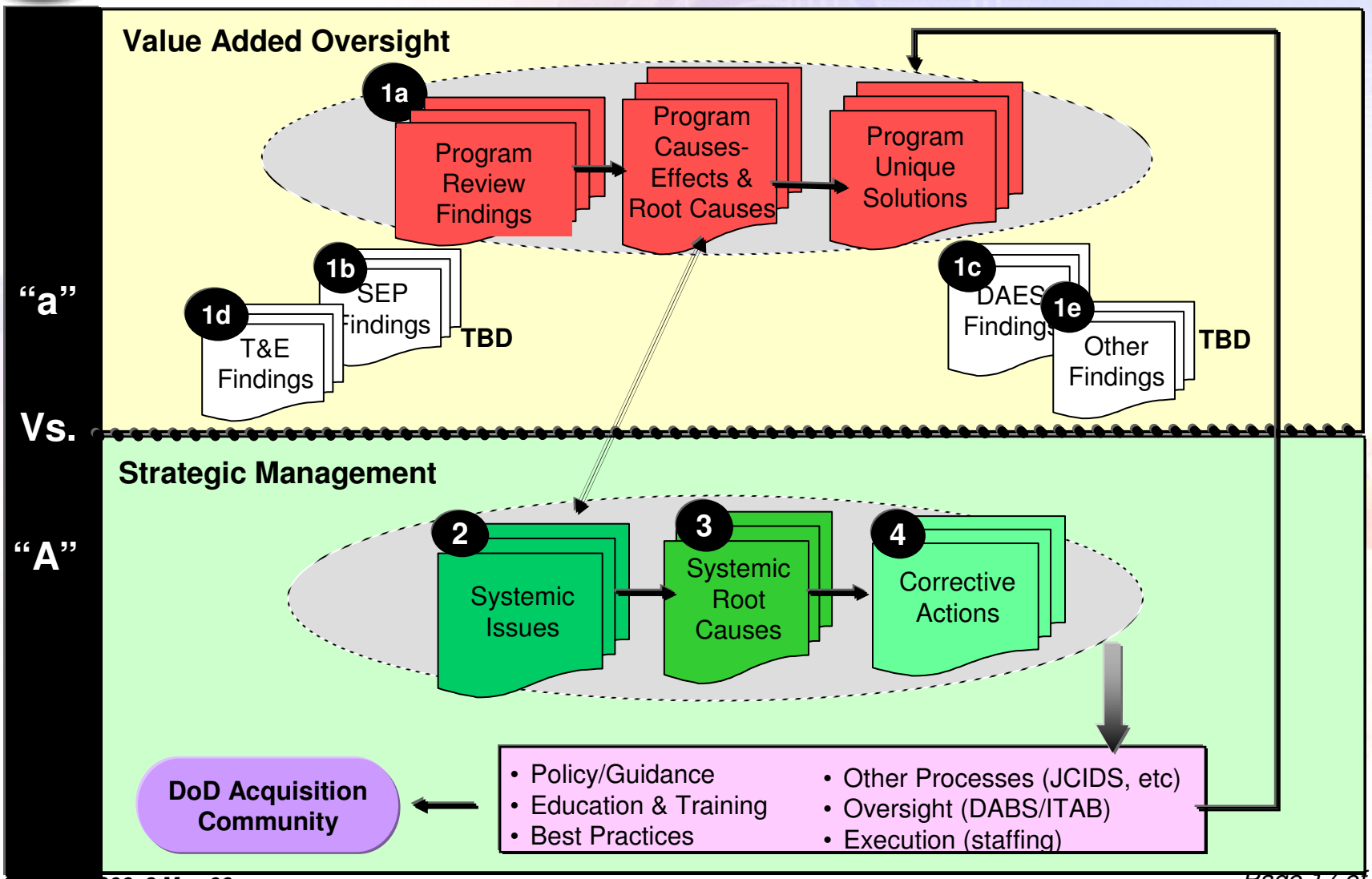
Long Term

Parametric Modeling

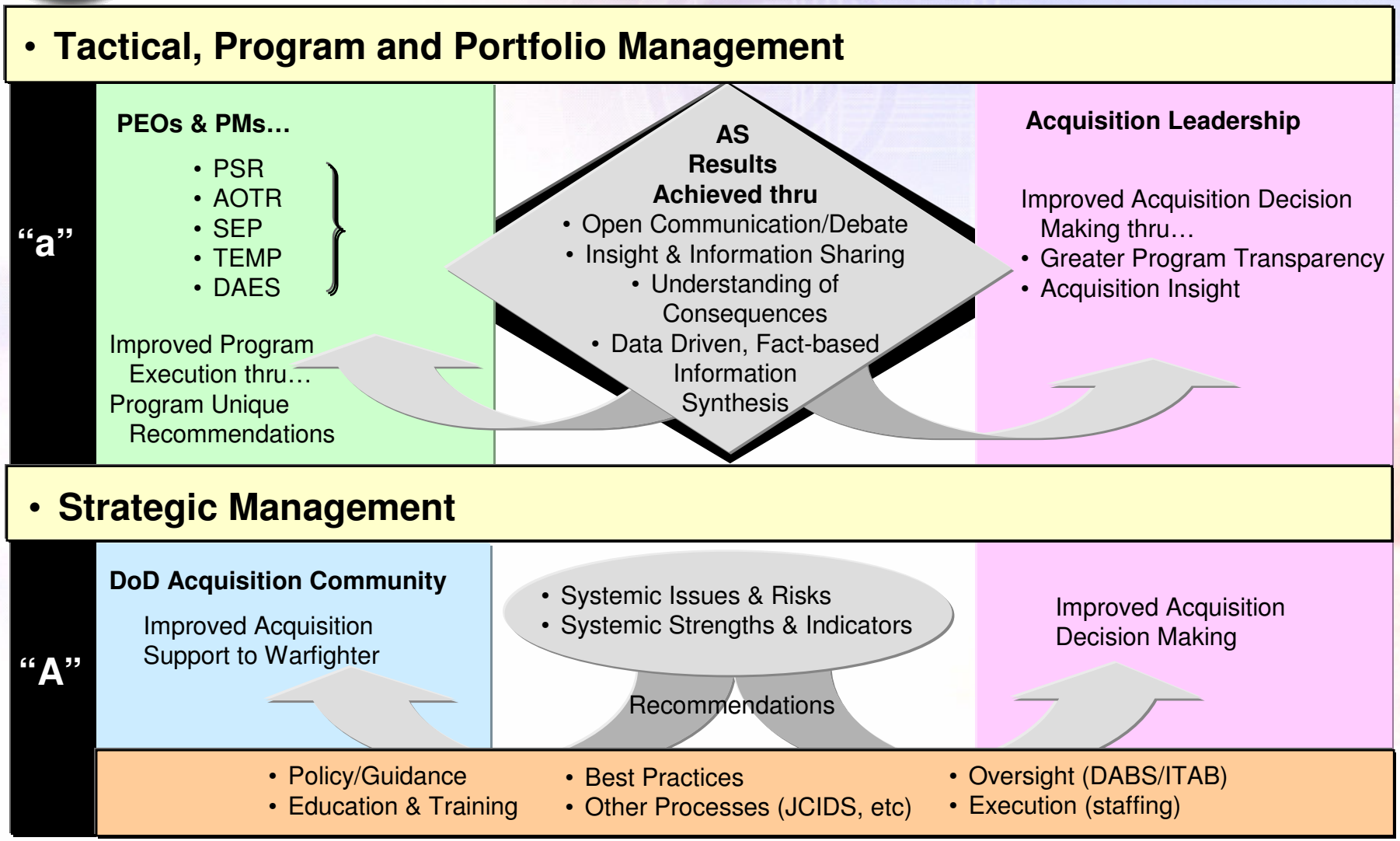
- Trend data, analyzed over time
  - Track individual cost, schedule, performance over time
  - Track improved performance vs. corrective actions made; successful practices incorporated
- Identify relationships across multiple data sources (SEP/TEMP, DAES, NARs, etc.) and CAIG cost model

Systemic Analysis Model

Steps 1A, 2-4 Underway



Providing Value Added Oversight



Questions/Discussion

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